Inside Wallops

National Aeronautics and Space Administration
Goddard Space Flight Center
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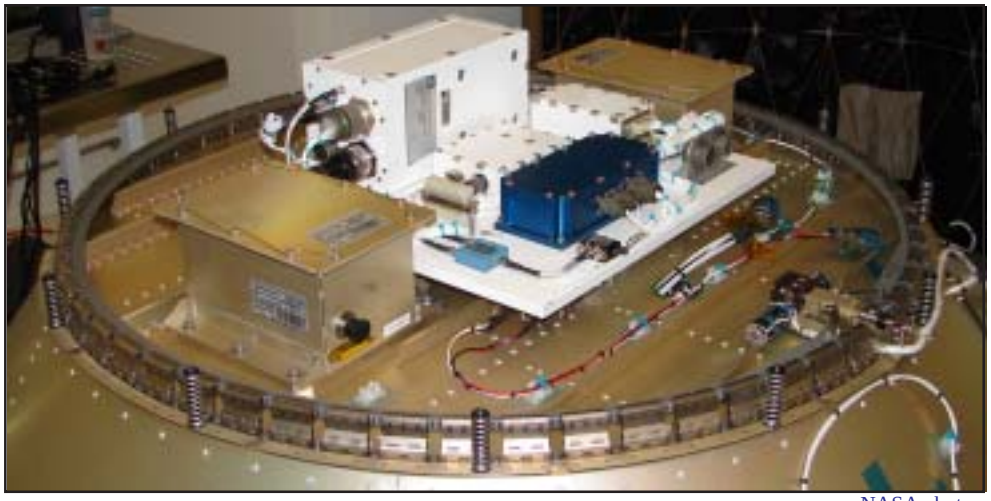
Wallops Has a Role in SpaceX Falcon1 Launch

The flight of the SpaceX Falcon 1 launch vehicle on March 21, named Demo2, from the U.S. Army Space and Missile Defense Command's Reagan Test Site, Omelek Island, Kwajalein Atoll, Republic of the Marshall Islands in the Pacific Ocean was being closely monitored by engineers at the Wallops Flight Facility.

The payload consisted of two NASA experiments demonstrating critical elements to enable operationally responsive space access and lower cost range operations.



Demo2 payload that included the AFSS and LCT2. NASA photo

The first experiment, the Autonomous Flight Safety System (AFSS), is managed by NASA Wallops Flight Facility (WFF) and was jointly developed by WFF and NASA's Kennedy Space Center. This on-board system is being designed to enhance and eventually replace costly range tracking components required for flight termination. The AFSS evaluated data from independent on-board navigation sensors, made flight termination decisions, and issued simulated Flight Termination System (FTS) commands. During the Falcon 1 launch, the AFSS was flown in a shadow mode and provided telemetry indicating whether the vehicle flew a nominal trajectory or whether potentially unsafe conditions existed. It was not connected to the Falcon 1 FTS.

The second experiment, the Low-Cost Tracking and Data Relay Satellite System (TDRSS) Transmitter (LCT2) was developed by WFF. The LCT2 is a low-cost, digital TDRSS transmitter for launch and flight vehicles that relays telemetry data to ground controllers using the NASA TDRSS communications network. It was implemented in the Demo2 payload to provide verification of AFSS functionality. NASA's TDRSS network also is used for the space shuttle, satellite, and launch vehicle communication.

Despite the successful completion of compatibility testing with launch vehicle systems, a concern was raised on the day of the launch that the LCT2 could potentially interfere with the vehicle's GPS subsystems. Since time was not available to conduct additional testing, a decision was made to fly with the LCT2 powered off. As a result, detailed response data from one of the two redundant AFSS processors was not available for post-test analysis.

At launch, the AFSS properly detected lift-off and enabled the appropriate flight termination mission rules. Both flight processors properly issued and released ARM and FIRE commands to the voting circuit when the vehicle instantaneous impact prediction intruded the test exclusion zone at L+4 minutes 27 seconds and exited it at L+5 minutes 9 seconds. Both processors issued ARM and FIRE functions associated with the erratic vehicle performance experienced later during flight.

Using the available telemetry data, the team can confirm that a termination command was issued due to a violation of a moving-gate rule established to identify erratic flight from in-plane vehicle failures. The erratic behavior rule firing occurred late in the second stage flight.

Although the Demo2 flight did not reach orbit, the engineering development team was able to exercise many elements of the AFSS Concept of Operations in the integration, test and launch operations environment of an Expendable Launch Vehicle.

A preliminary review of the flight data indicates that the team met test objectives that included successful operation and post-flight performance characterization of the AFSS hardware and software elements. These are part of a system design that will ultimately comply with accepted range safety flight termination system standards.

The AFSS engineering team is currently engaged in a post-test analysis of the data. This will include conducting a detailed review of the in-flight telemetry data, correlating observed AFSS events with Falcon 1 vehicle telemetry data, cataloging and investigating in-flight anomalies, and collecting lessons learned.

The SpaceX Falcon1 launch along with the WFF payload demonstration was sponsored by the Defense Advanced Research Projects Agency (DARPA) Falcon Program.

The goal of this DARPA program is to develop and demonstrate an affordable responsive space lift capability.

Support for C-17 Training Flights

"I wanted to pass along our sincere thanks to Dawna Marr, Mission Manager; Jim Barnes, Wallops Control Tower; Rob Hurley and Jay Brown, NASA Range and Mission Management Office, for your work and cooperation.

Our students were able to get some excellent training because of your efforts. They were amazed at how well the tower understood their intentions and were so helpful.

The two Squadron Commanders that flew as observers were very impressed with the facilities and the capabilities you provided. We hope to see you again in the future."

Justin W. Tull, Captain
57th Weapons Squadron
McGuire Air Force Base

ChemLab Passes Inspection

The Virginia Division of Consolidated Laboratory Services recently inspected the Wallops Drinking Water Laboratory. The inspection was a resounding success.

The inspector found no deviations and is recommending the ChemLab for certification, which will allow them to test for microbiological activity in drinking water samples for commercial customers.

In fact, it will be the only certified drinking water laboratory on Virginia's Eastern Shore.

The lab also will be applying for recipricol certification by the State of Maryland. This should result in significant growth of the ChemLab's commercial customer base and is major milestone in the ChemLab's commercialization plan; a goal and objective outlined in the Wallops Institutional Consolidated Contract (WICC). EG&G (a Division of URS) maintains and oversees the operation of the Wallops ChemLab.

Disposing of Excess and Recyclable Material

Personnel delivering excess material (controlled equipment, non-controlled equipment and materials, scrap metal, or wood) to the Building N-222 warehouse must stop and check in with Kevin Harmon, Roland Satchell, or Alvin Taylor BEFORE off-loading any material.

If no one is available, call Terry Ewell at x1133 or Regina Waters at x1337.

All scrap metal generated at Wallops Flight Facility must be disposed of properly via the GSA scrap metal contractor (Kroeger's Salvage), using one of the following four options:

1) Deliver to Building N-222

2) Request pickup by calling the HELP desk at x4357

3) Request a five-cubic-yard tipper to be delivered to the site

4) Request a roll-off to be delivered to the site

If you have special requirements or need more information, call Terry Ewell at x1133.

White paper must be deposited in recycling containers. It is not accepted at Building N-222. White paper has to be removed from boxes, files and notebooks and deposited in the recycling containers located in all buildings.

If you do not have a recycling box or you need additional boxes, call Freda Johnson at x1466.

Wallops Shorts.....

Congratulations

Sandy Kleckner, NASA Systems Software Engineering Branch, recently received the ISD Engineering Excellence Award in recognition of outstanding leadership, technical expertise, and commitment to excellence as the project lead for the Mission Planning Lab.

Herb Morgan retired effective March 31 with over 31 years of government service. Morgan was an electronics technician in Electrical Engineering Branch, NASA Wallops Flight Facility.

On the Road

Penn State students, Nick Wroblewski, Kenny Kwok, Fred Upchurch, Nate Empson, and Kris Greenert participated in a Career Day Event at Nandua Middle School, Onley, VA., on March 30. They are co-op students for NSROC (NASA Sounding Rocket Operations Contract).

John Campbell, Director, NASA Wallops Flight Facility, was a guest speaker at the Maryland Space Business Roundtable, Martin's Crosswind's, Greenbelt, MD., on March 27.

John Campbell was a panelist at the Universities Space Research Association Symposium in Columbia, MD., on March 30.

Wallops Island Skeeter 5K

11 a.m.
April 26
Cropper Center

Age Groups for Men and Women
25 and Under
26 to 40
41 and Above

Awards will be given to the top two in each male/female category. T-shirts will be given to the first 50 entries.

For further information contact FCCM(SW) McGahagin at x2577 or by email: cmc@scsc.wal.nswc.navy.mil

Inside Wallops is an official publication of Goddard Space Flight Center and is published by the Wallops Office of Public Affairs, Extension 1584, in the interest of Wallops employees. Recent and past issues of *Inside Wallops* also may be found on the NASA Wallops Flight Facility homepage: www.wff.nasa.gov

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